



FIG. 1

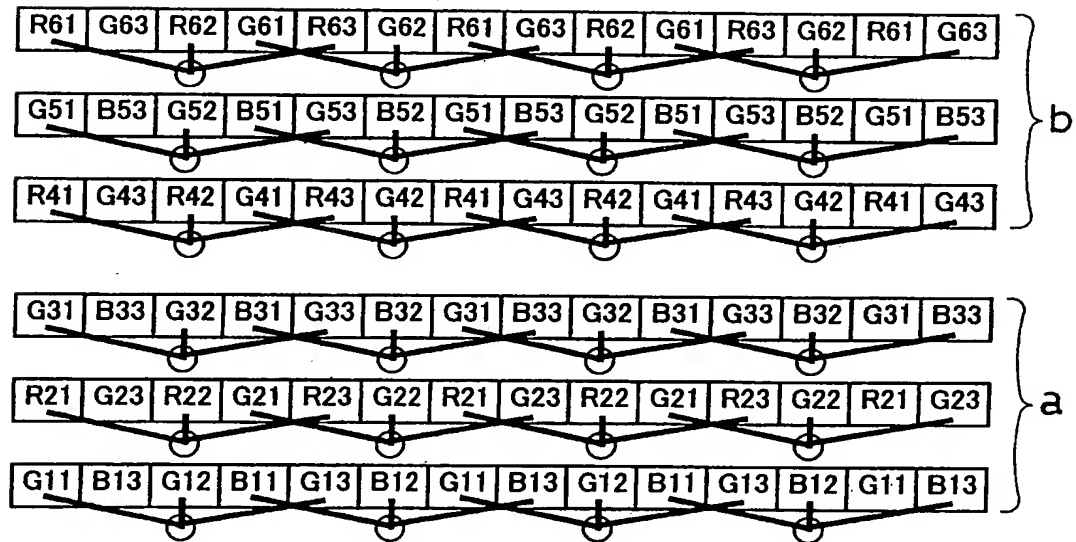
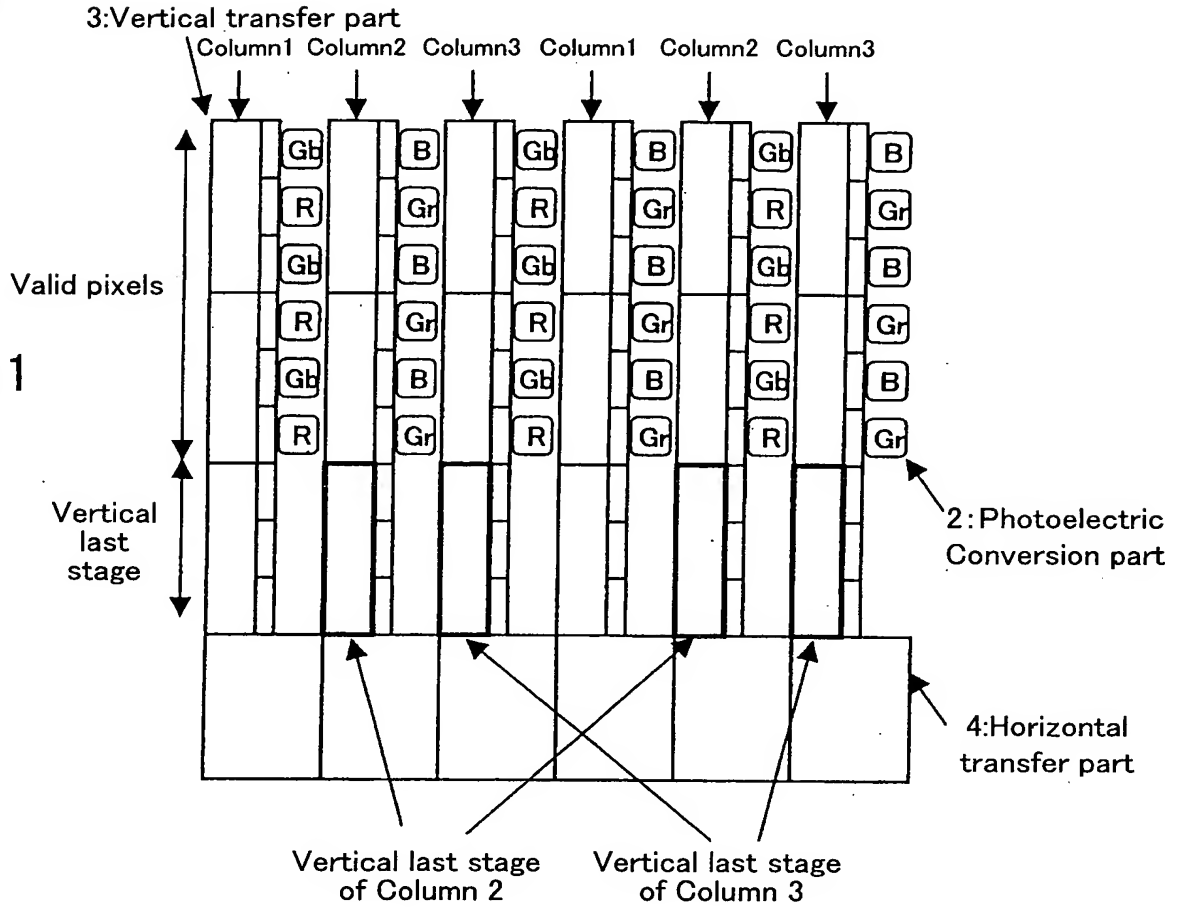


FIG. 2

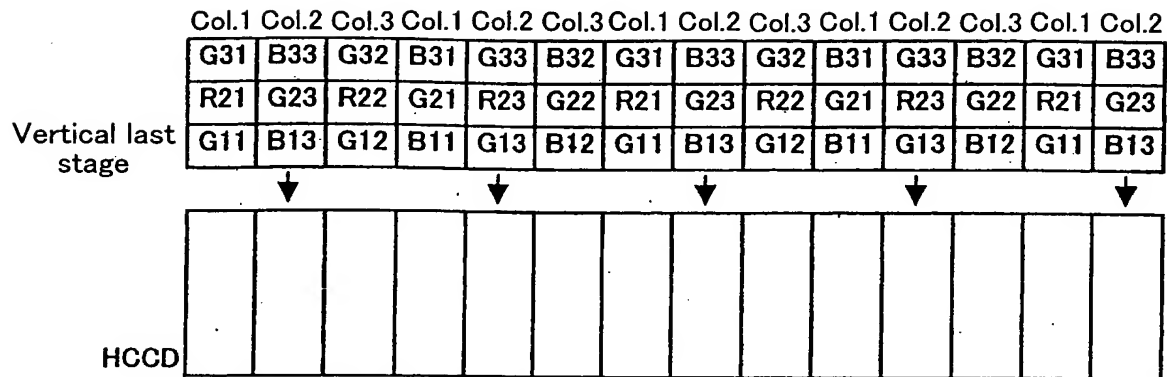


FIG. 3

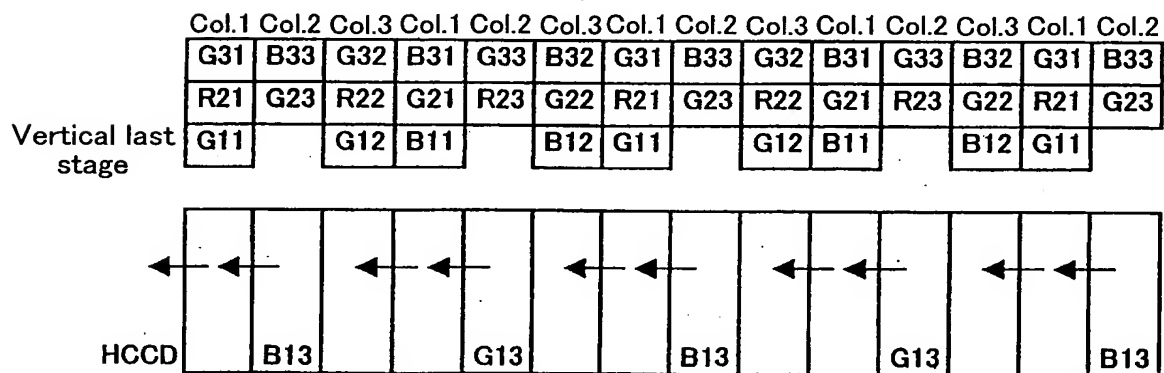


FIG. 4

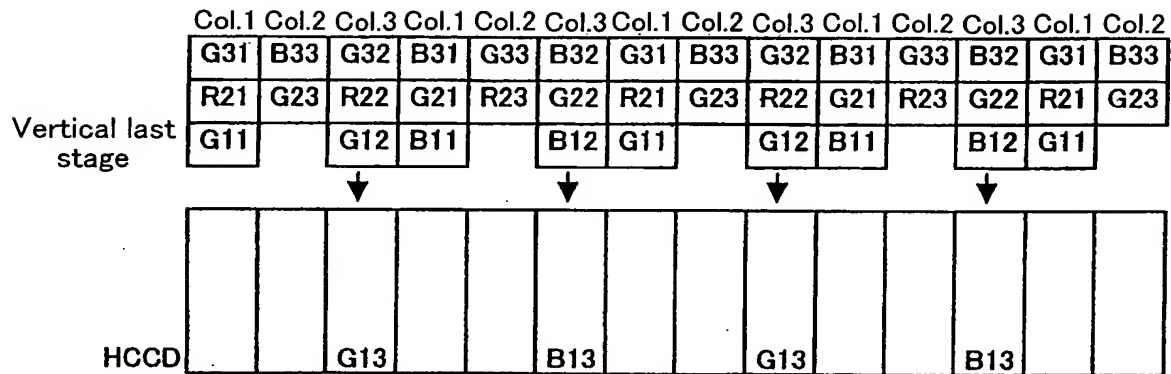


FIG. 5

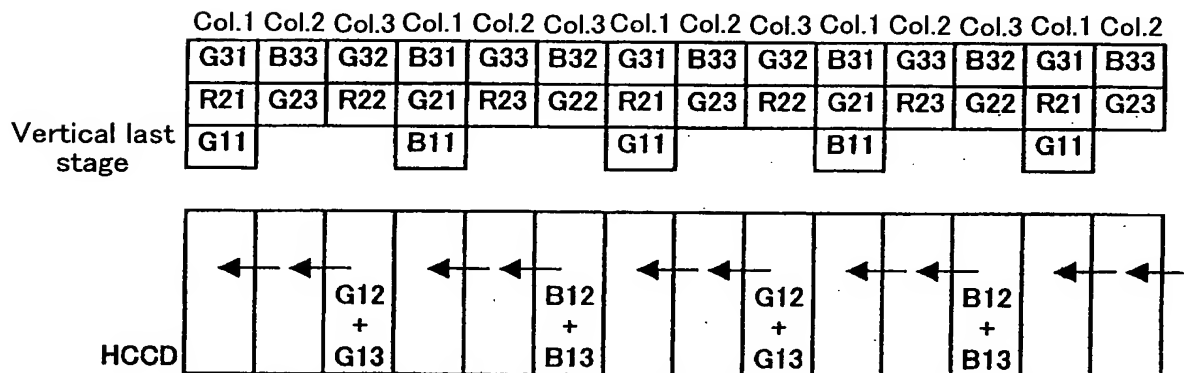


FIG. 6

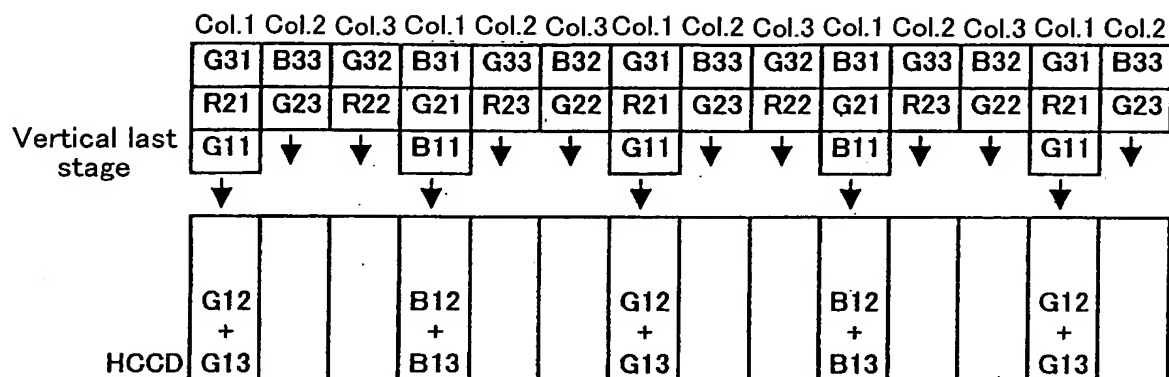


FIG. 7

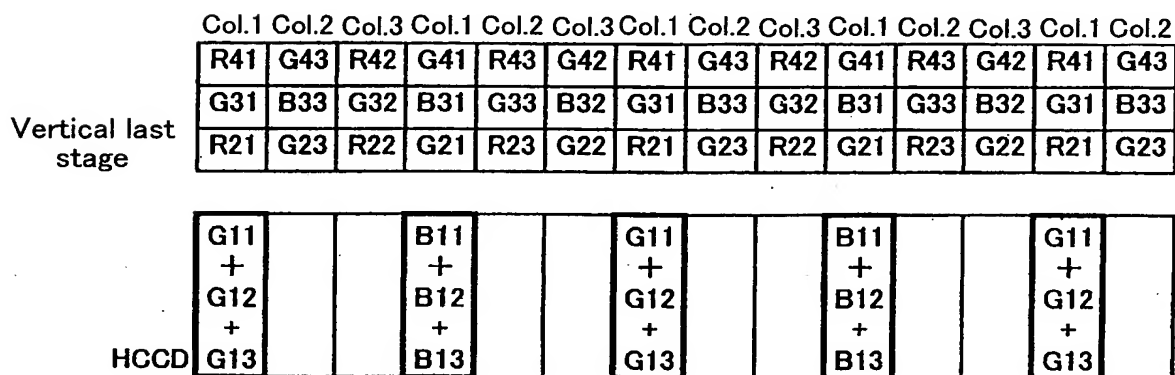


FIG. 8

	Col.1	Col.2	Col.3	Col.1	Col.2	Col.3	Col.1	Col.2	Col.3	Col.1	Col.2	Col.3	Col.1	Col.2
	G51	B53	G52	B51	G53	B52	G51	B53	G52	B51	G53	B52	G51	B53
	R41	G43	R42	G41	R43	G42	R41	G43	R42	G41	R43	G42	R41	G43
Vertical last stage	G31	B33	G32	B31	G33	B32	G31	B33	G32	B31	G33	B32	G31	B33

R21		G11	G21		B11	R21		G11	G21		B11	R21	
+		+	+		+	+		+	+		+	+	
R22		G12	G22		B12	R22		G12	G22		B12	R22	
+		+	+		+	+		+	+		+	+	
R23		G13	G23		B13	R23		G13	G23		B13	R23	

FIG. 9

	Col.1	Col.2	Col.3	Col.1	Col.2	Col.3	Col.1	Col.2	Col.3	Col.1	Col.2	Col.3	Col.1	Col.2
	R61	G63	R62	G61	R63	G62	R61	G63	R62	G61	R63	G62	R61	G63
	G51	B53	G52	B51	G53	B52	G51	B53	G52	B51	G53	B52	G51	B53
Vertical last stage	R41	G43	R42	G41	R43	G42	R41	G43	R42	G41	R43	G42	R41	G43

G31	B11	R21	B31	G11	G21	G31	B11	R21	B31	G11	G21	G31	B11
+	+	+	+	+	+	+	+	+	+	+	+	+	+
G32	B12	R22	B32	G12	G22	G32	B12	R22	B32	G12	G22	G32	B12
+	+	+	+	+	+	+	+	+	+	+	+	+	+
G33	B13	R23	B33	G13	G23	G33	B13	R23	B33	G13	G23	G33	B13

FIG. 10

	Col.1	Col.2	Col.3	Col.1	Col.2	Col.3	Col.1	Col.2	Col.3	Col.1	Col.2	Col.3	Col.1	Col.2
	R61	G63	R62	G61	R63	G62	R61	G63	R62	G61	R63	G62	R61	G63
	G51	B53	G52	B51	G53	B52	G51	B53	G52	B51	G53	B52	G51	B53
Vertical last stage	R41	G43	R42	G41	R43	G42	R41	G43	R42	G41	R43	G42	R41	G43

	G31	B11	R21	B31	G11	G21	G31	B11	R21	B31	G11	G21	G31	B11
←	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	G32	B12	R22	B32	G12	G22	G32	B12	R22	B32	G12	G22	G32	B12
	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	G33	B13	R23	B33	G13	G23	G33	B13	R23	B33	G13	G23	G33	B13
	a6	a1	a2	a3	a4	a5	a6	a1	a2	a3	a4	a5	a6	a1

FIG. 11

	Col.1	Col.2	Col.3	Col.1	Col.2	Col.3	Col.1	Col.2	Col.3	Col.1	Col.2	Col.3	Col.1	Col.2
	G31	B33	G32	B31	G33	B32	G31	B33	G32	B31	G33	B32	G31	B33
	R21	G23	R22	G21	R23	G22	R21	G23	R22	G21	R23	G22	R21	G23
Vertical last stage	G11	B13	G12	B11	G13	B12	G11	B13	G12	B11	G13	B12	G11	B13

	R61	G41	G51	G61	R41	B51	R61	G41	G51	G61	R41	B51	R61	G41
	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	R62	G42	G52	G62	R42	B52	R62	G42	G52	G62	R42	B52	R62	G42
	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	R63	G43	G53	G63	R43	B53	R63	G43	G53	G63	R43	B53	R63	G43

FIG. 12

Vertical last stage

Col.1	Col.2	Col.3	Col.1	Col.2	Col.3	Col.1	Col.2	Col.3	Col.1	Col.2	Col.3	Col.1	Col.2
G31	B33	G32	B31	G33	B32	G31	B33	G32	B31	G33	B32	G31	B33
R21	G23	R22	G21	R23	G22	R21	G23	R22	G21	R23	G22	R21	G23
G11	B13	G12	B11	G13	B12	G11	B13	G12	B11	G13	B12	G11	B13

R61	G41	G51	G61	R41	B51	R61	G41	G51	G61	R41	B51	R61	G41
+	+	+	+	+	+	+	+	+	+	+	+	+	+
R62	G42	G52	G62	R42	B52	R62	G42	G52	G62	R42	B52	R62	G42
+	+	+	+	+	+	+	+	+	+	+	+	+	+
R63	G43	G53	G63	R43	B53	R63	G43	G53	G63	R43	B53	R63	G43

b6 b1 b2 b3 b4 b5 b6 b1 b2 b3 b4 b5 b6 b1

FIG. 13

Two dimensional re-arrangement of output signal

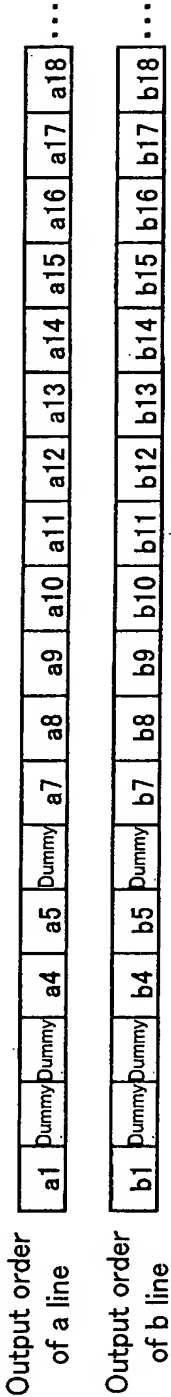


FIG. 14A

Two dimensional re-arrangement of mixed pixels at the center of the pixels

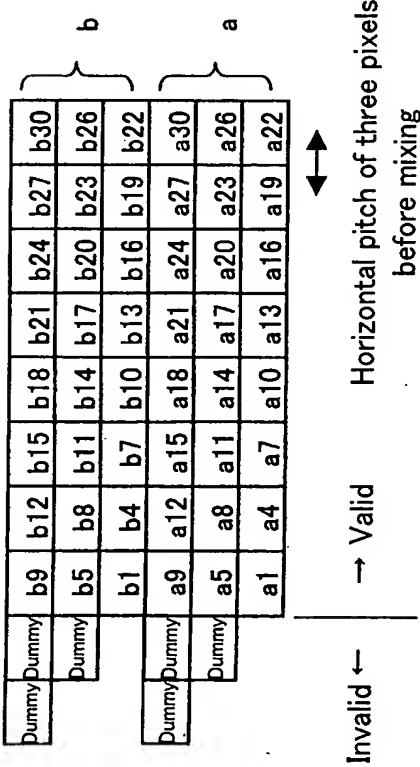


FIG. 14B

Color arrangement of mixed pixels

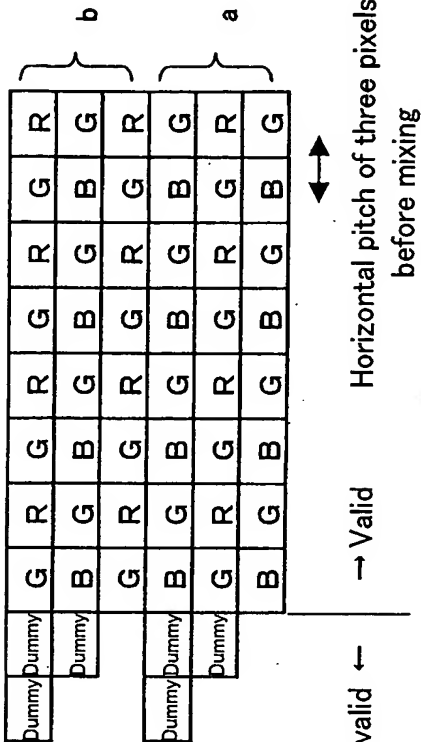


FIG. 14C



FIG. 15

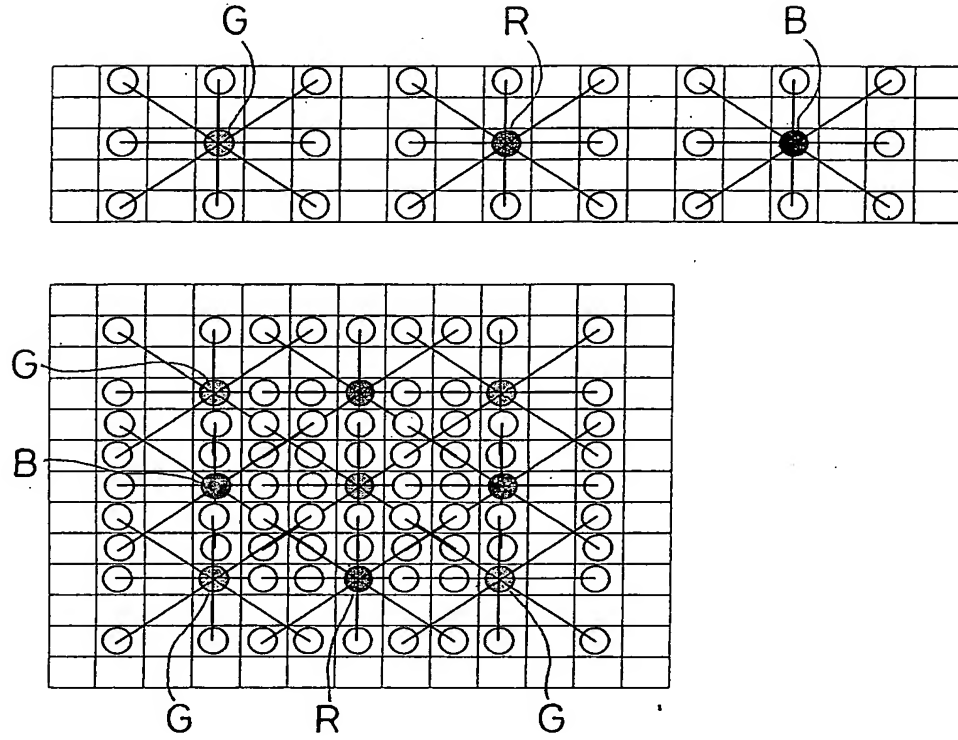
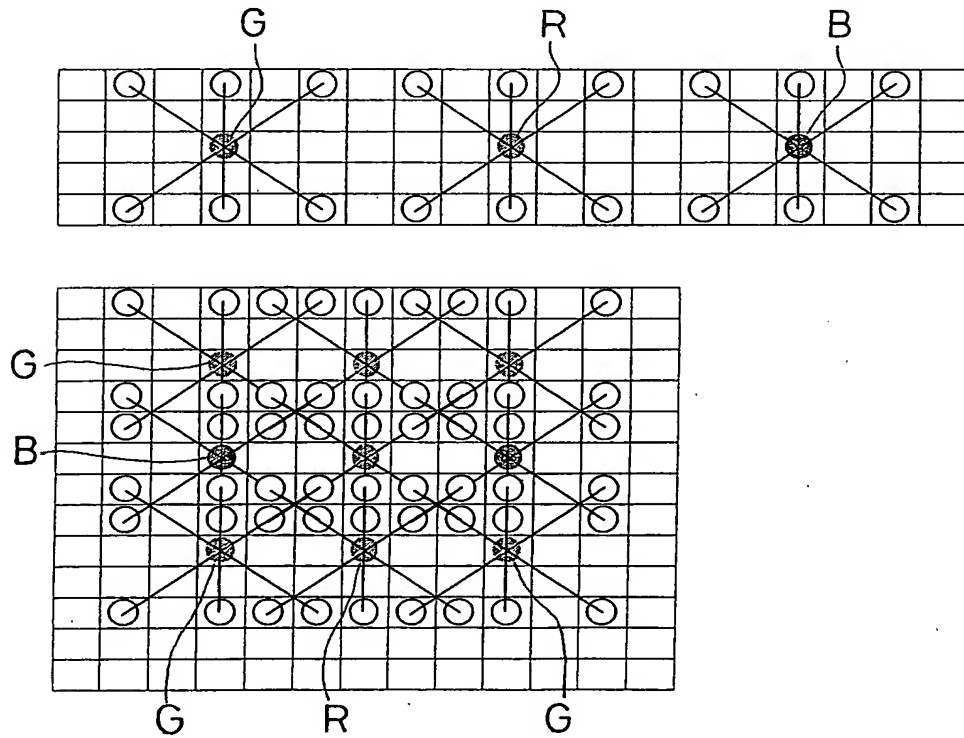


FIG. 16



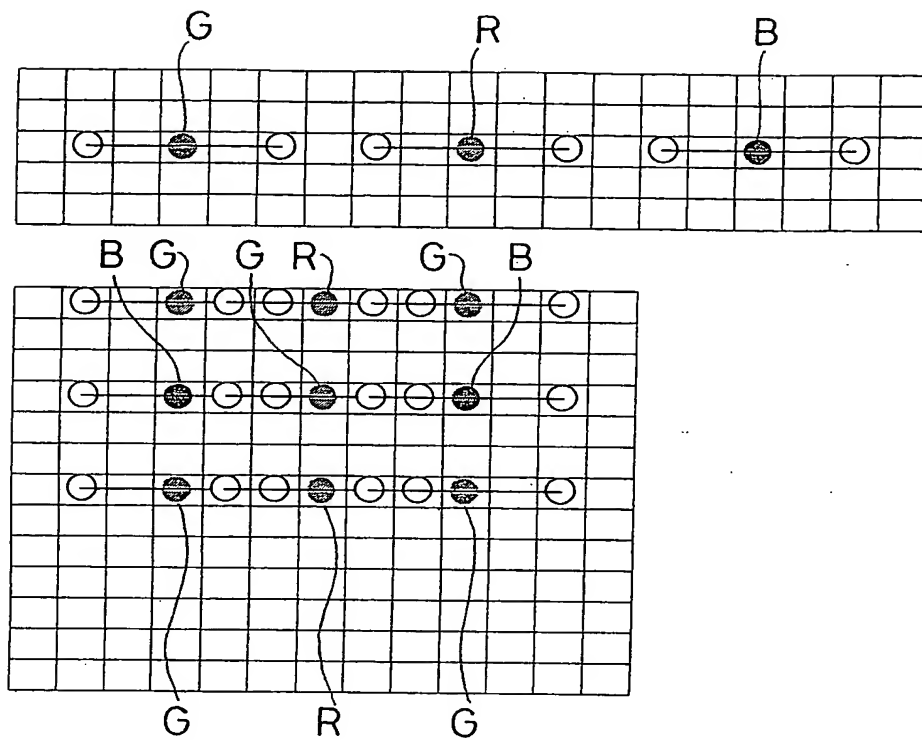


FIG. 17

FIG. 18

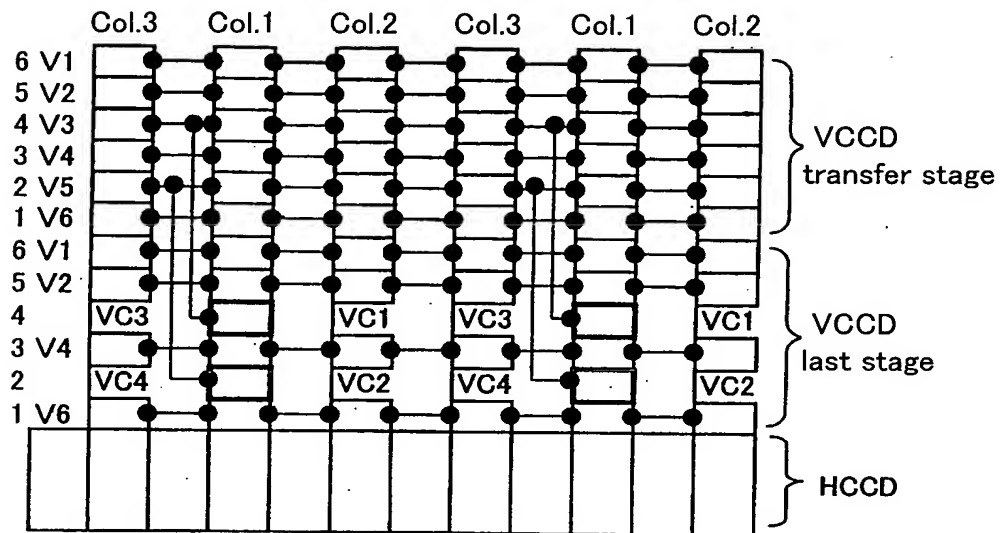
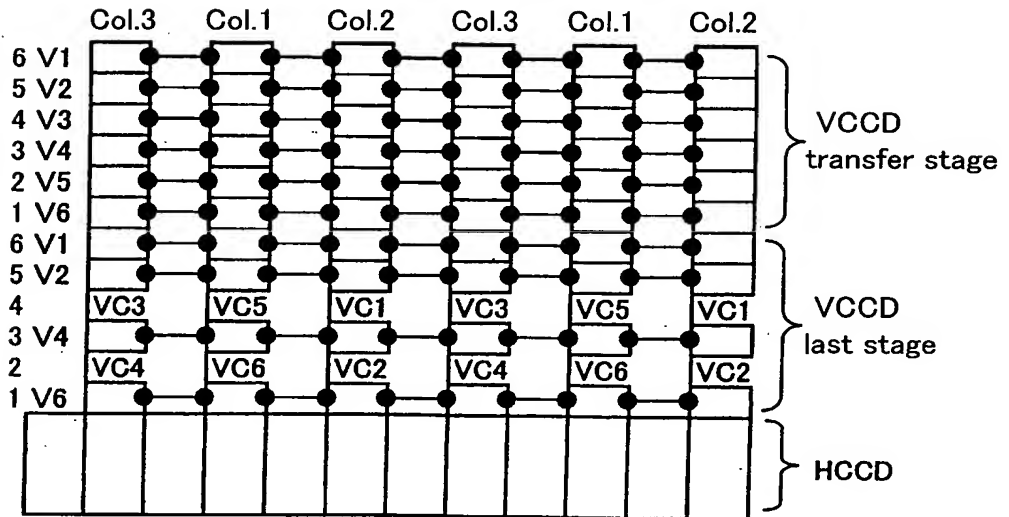


FIG. 19





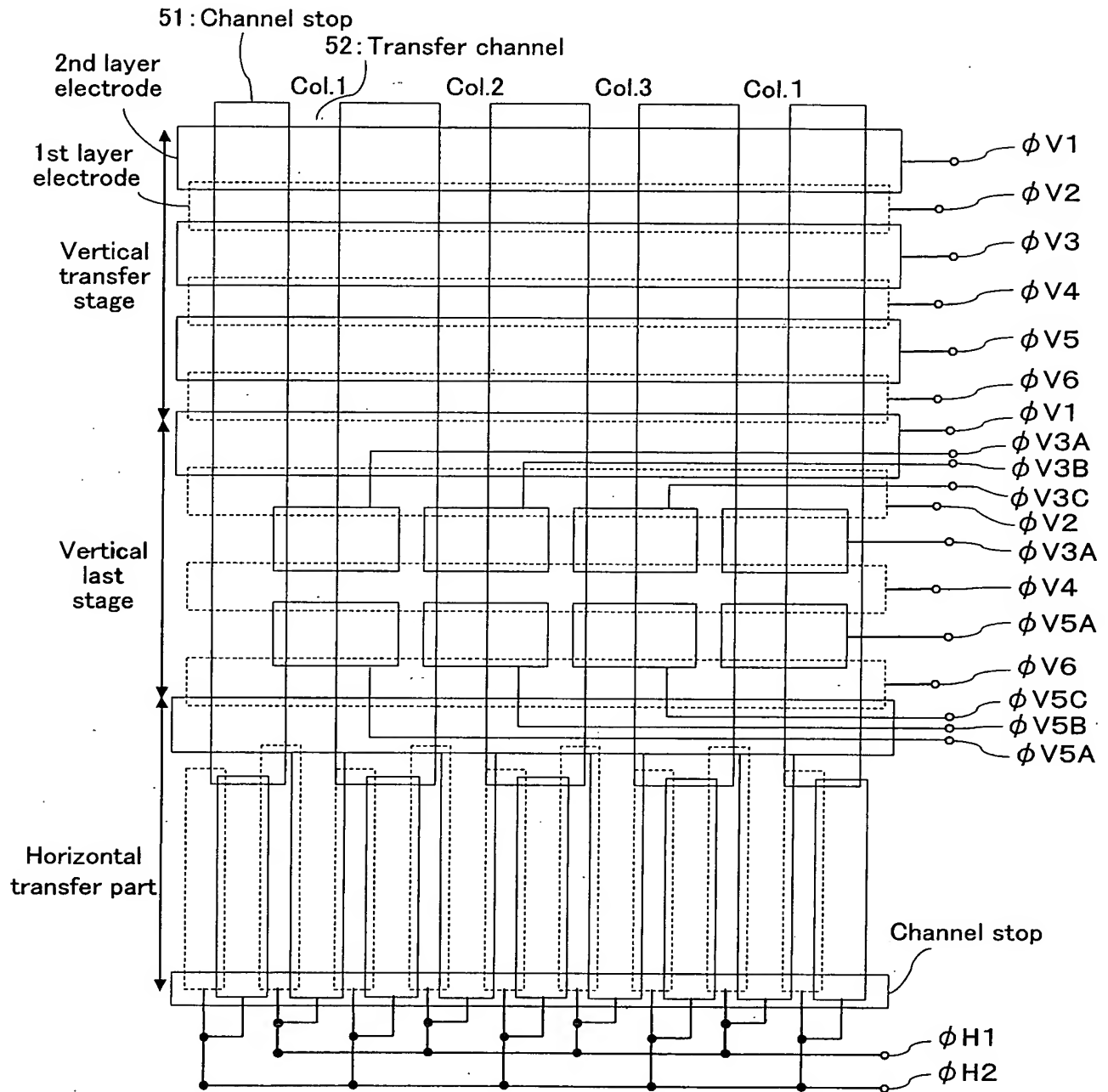


FIG.22

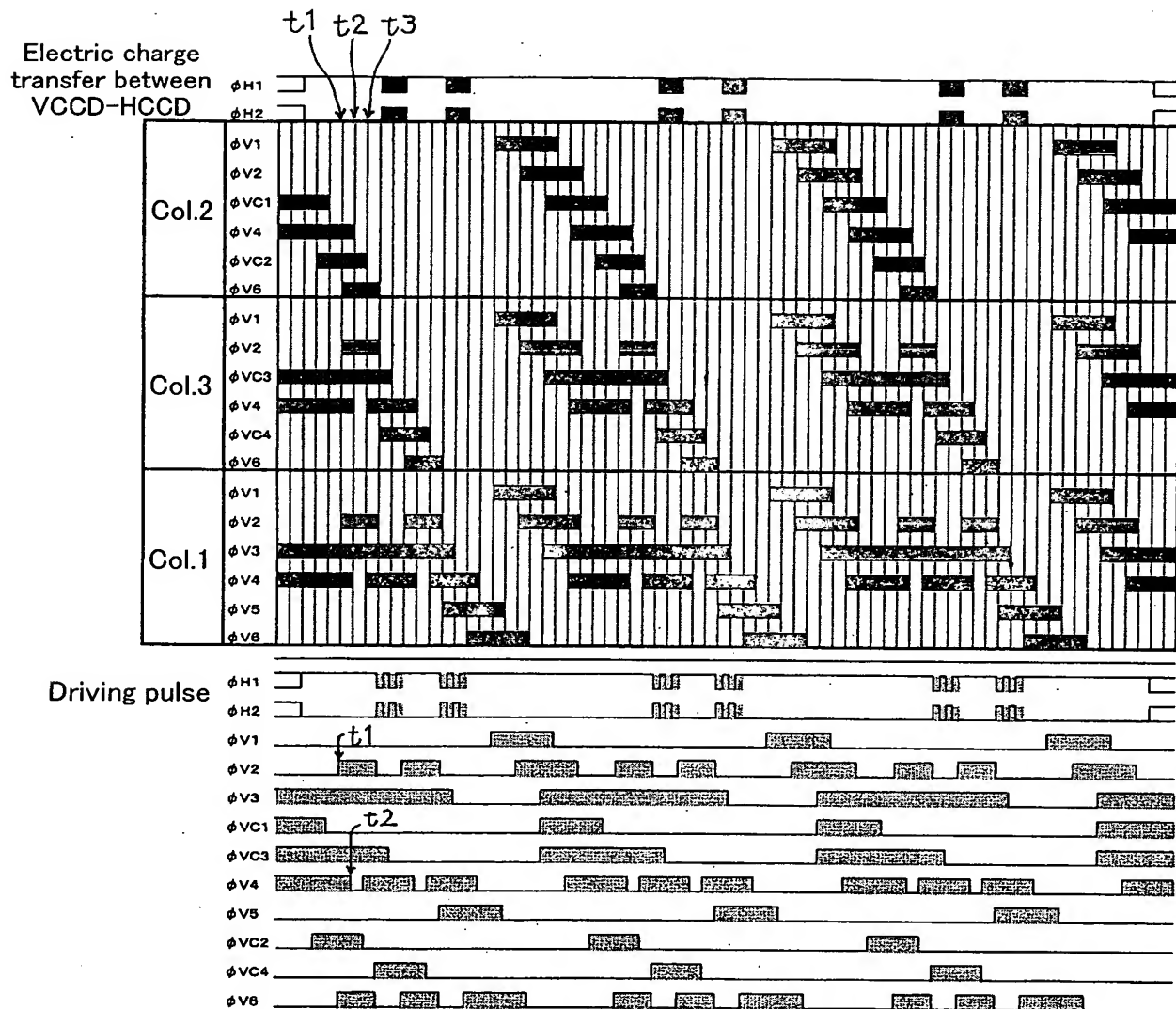


FIG. 23

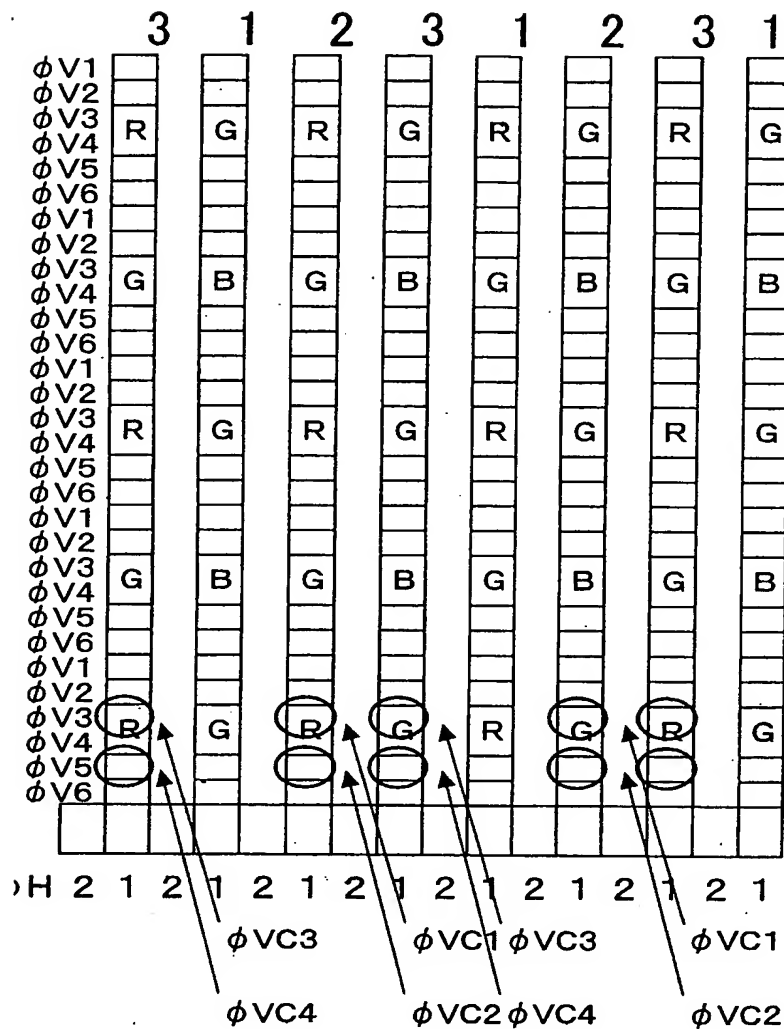


FIG. 24

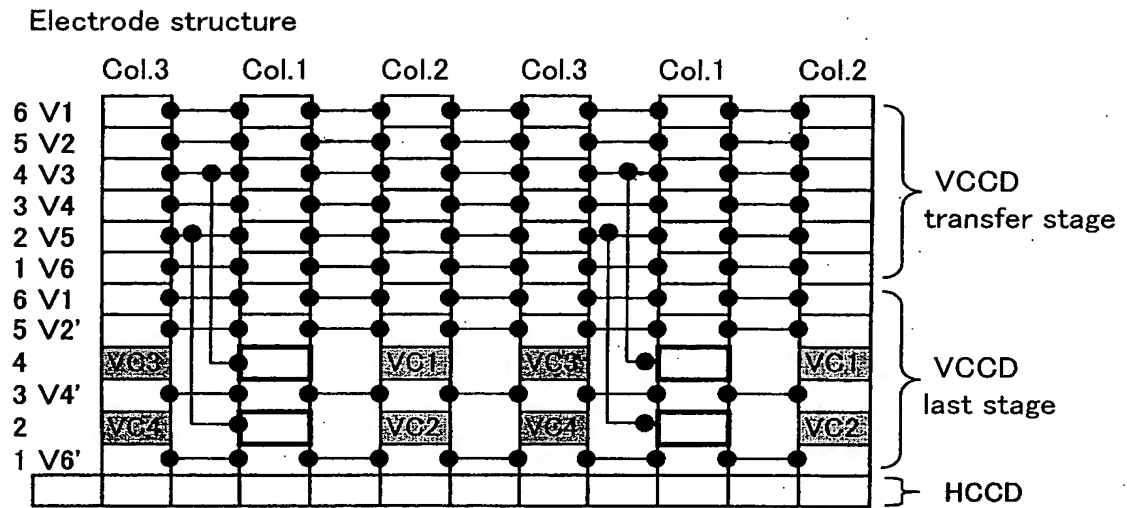


FIG. 25



Electric charge  
transfer between  
VCCD-HCCD

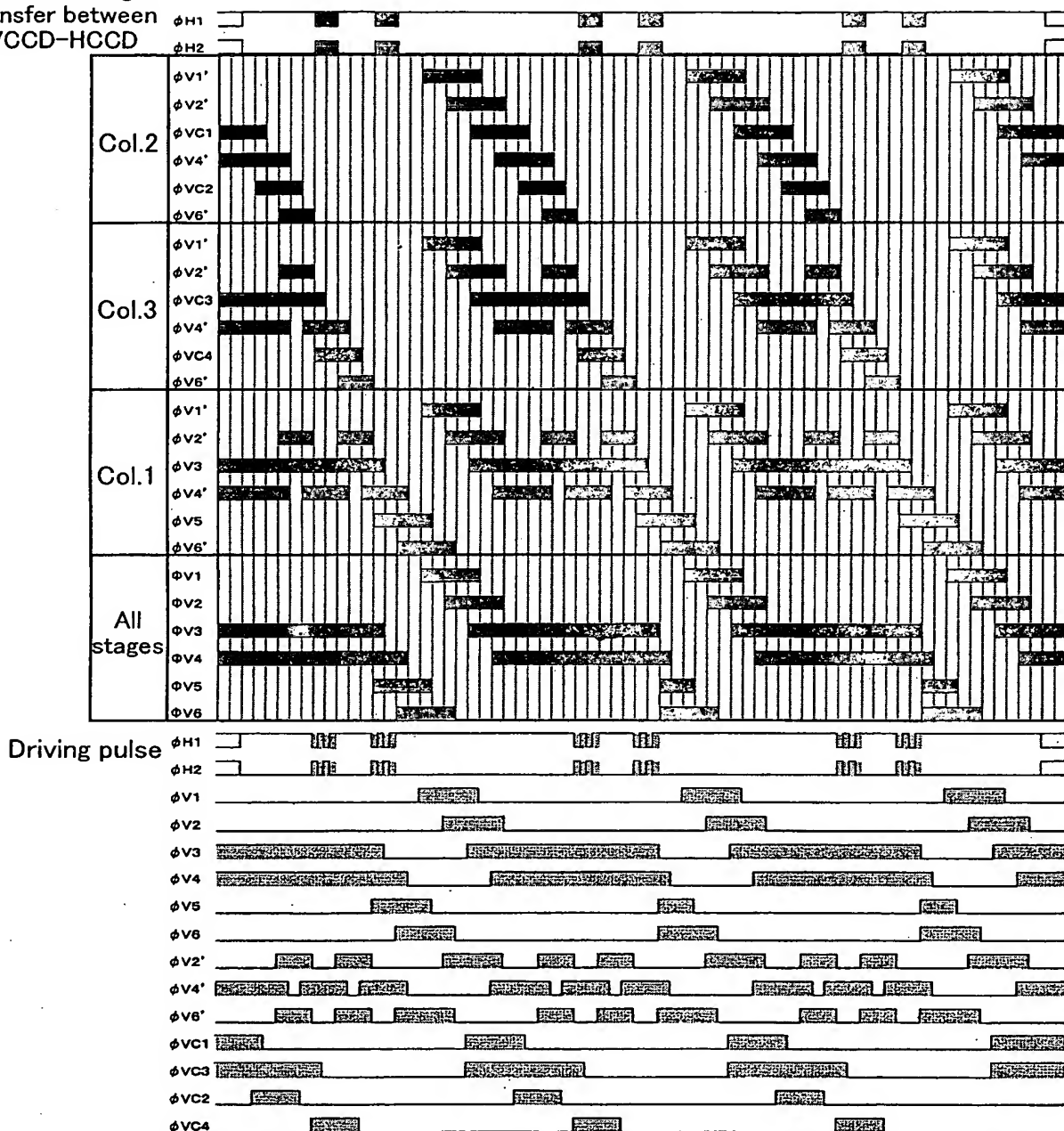


FIG. 26

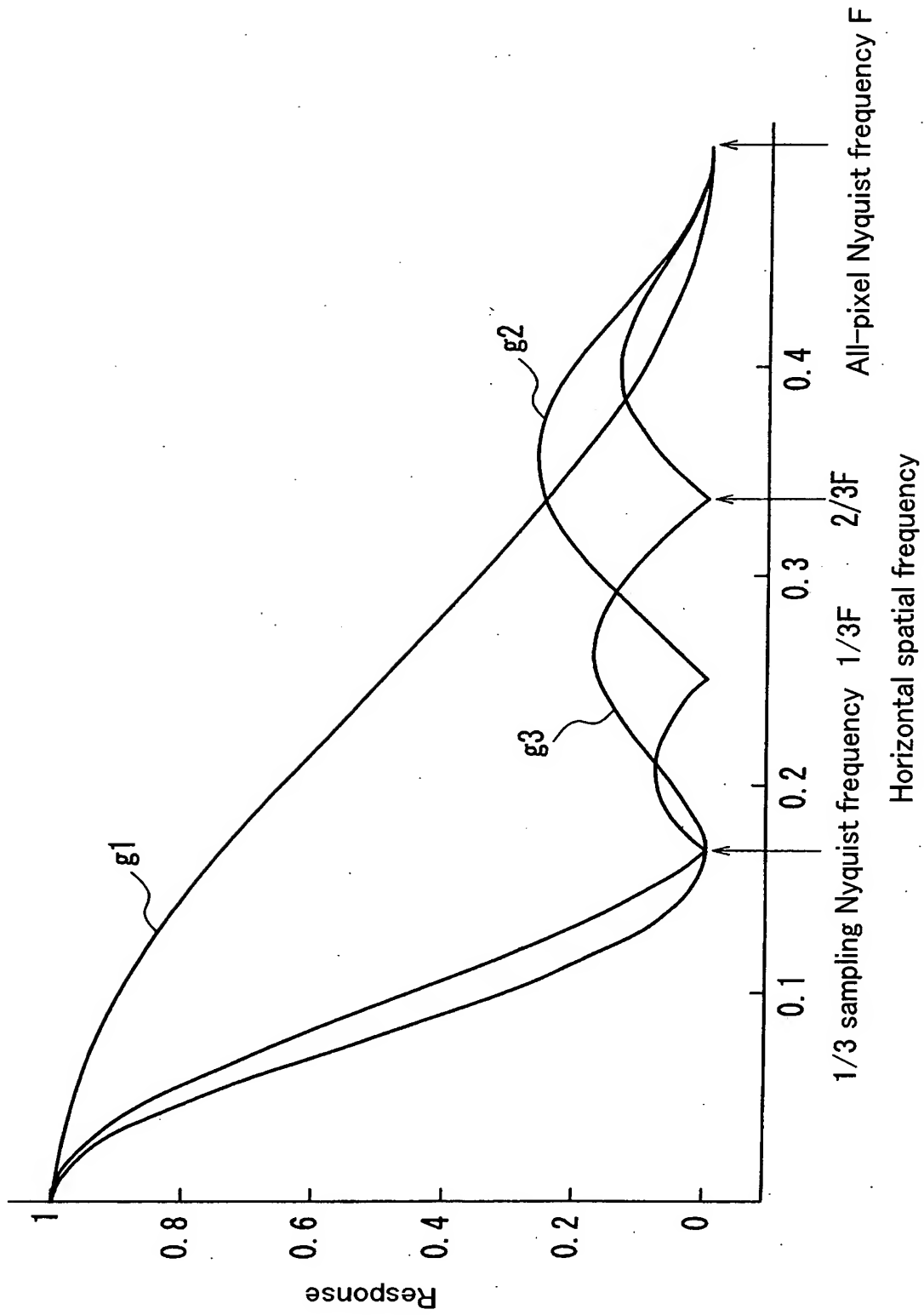


FIG. 27

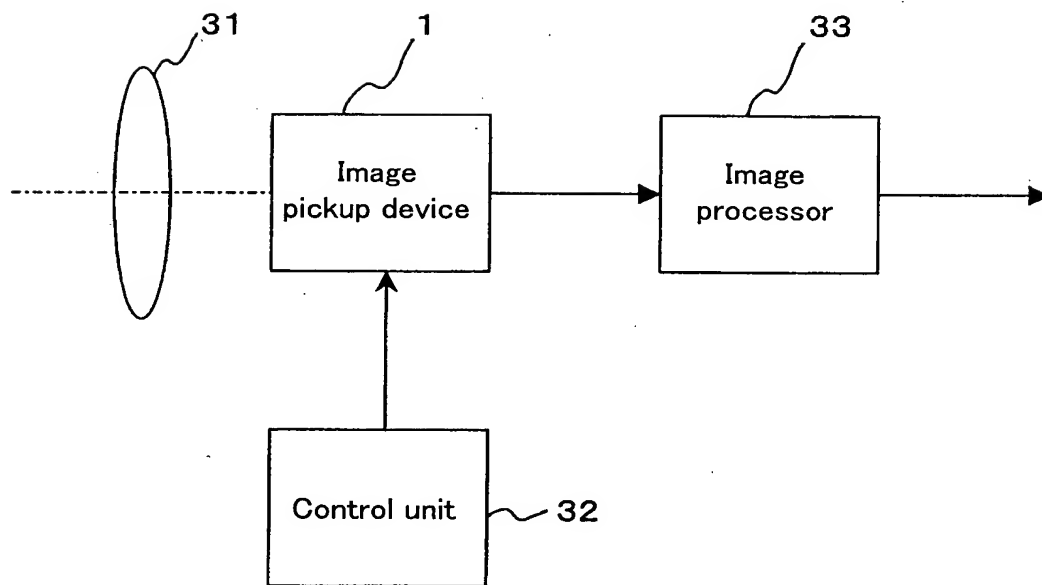


FIG. 28

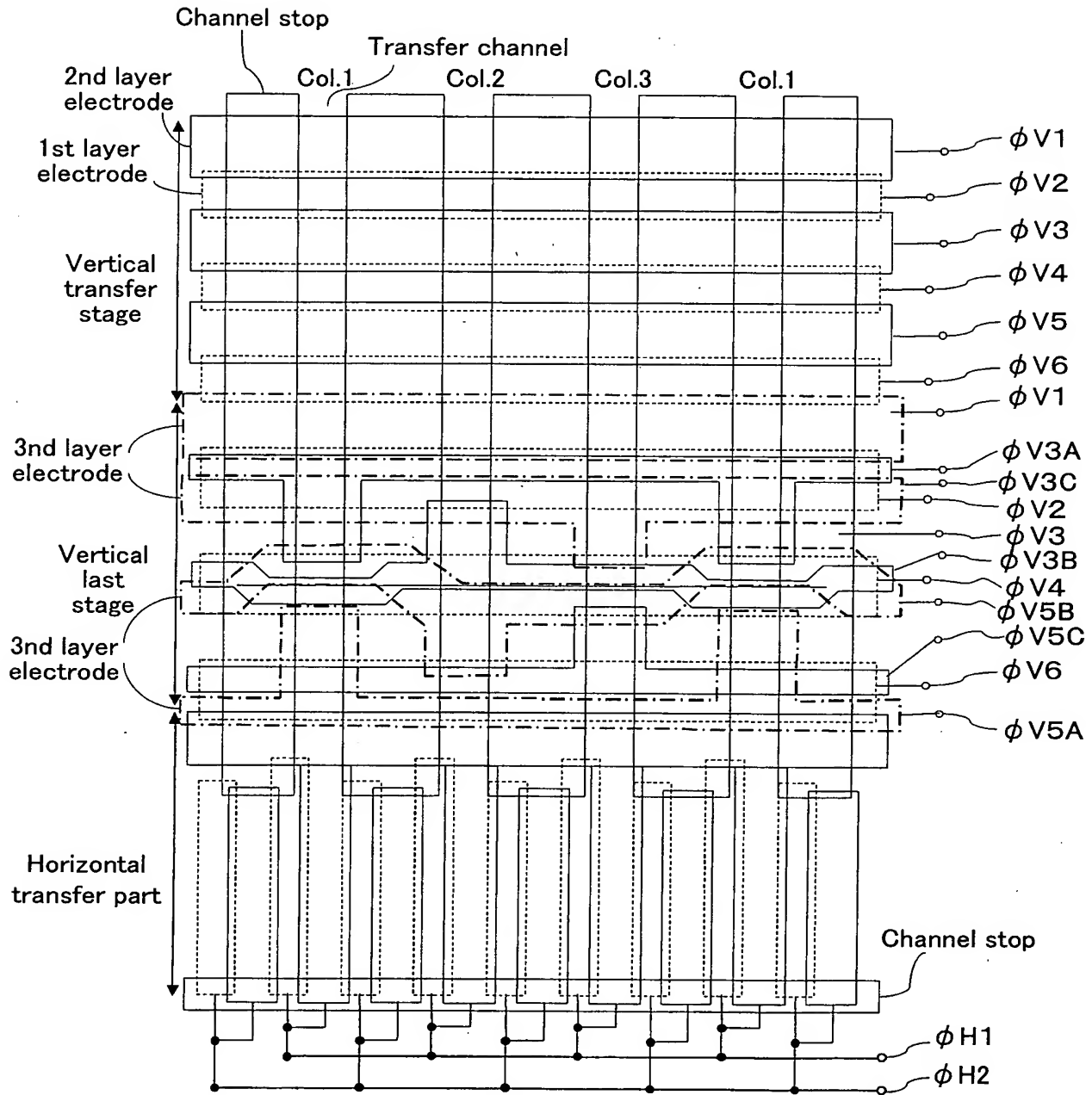


FIG.29

FIG.30

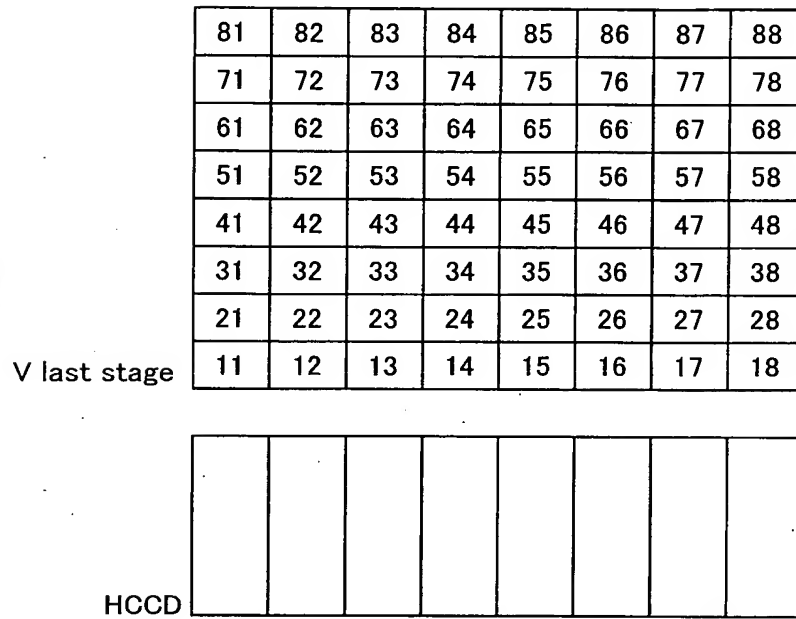


FIG.31

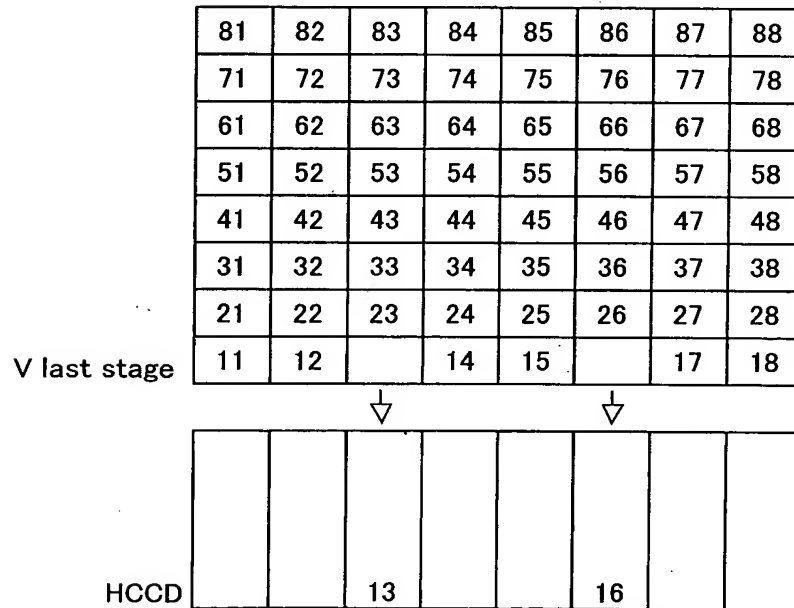


FIG.32

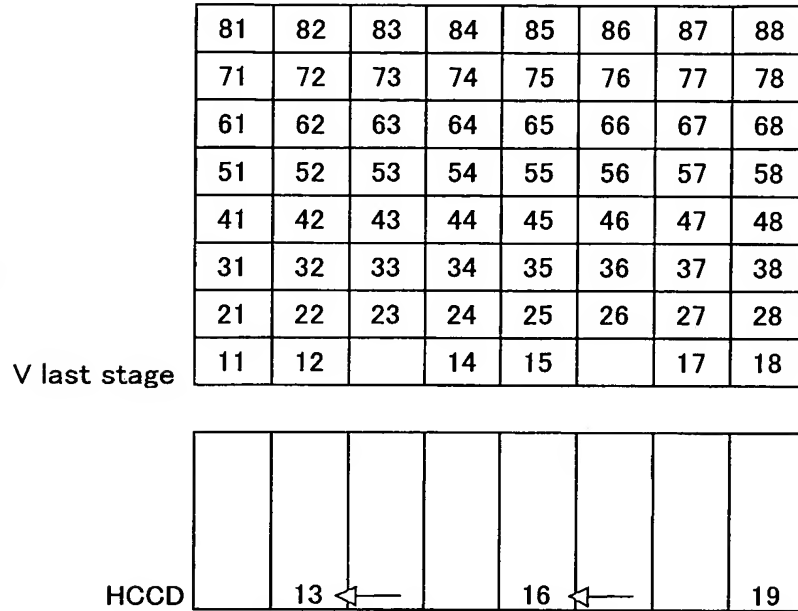


FIG.33

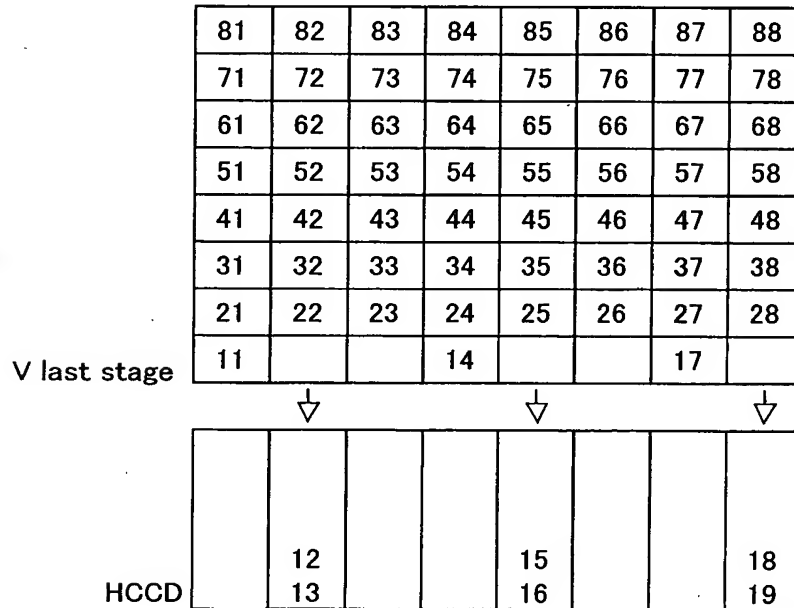


FIG.34

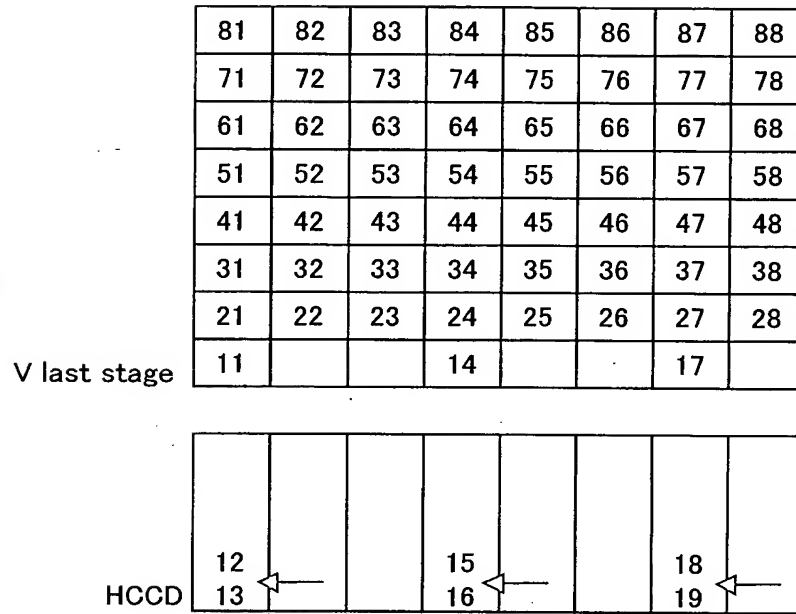


FIG.35

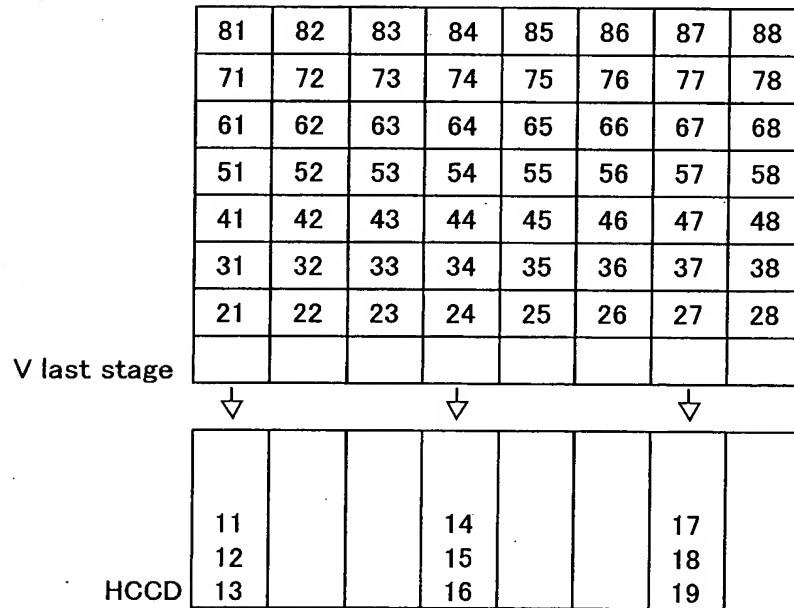


FIG.36

81	82	83	84	85	86	87	88
71	72	73	74	75	76	77	78
61	62	63	64	65	66	67	68
51	52	53	54	55	56	57	58
41	42	43	44	45	46	47	48
31	32	33	34	35	36	37	38
21	22	23	24	25	26	27	28

V last stage

11			14			17	
12			15			18	
13			16			19	

HCCD

FIG.37

81	82	83	84	85	86	87	88
71	72	73	74	75	76	77	78
61	62	63	64	65	66	67	68
51	52	53	54	55	56	57	58
41	42	43	44	45	46	47	48
31	32	33	34	35	36	37	38
21	22		24	25		27	28

V last stage

11			14			17	
12			15			18	
13		23	16		26	19	

HCCD



FIG.38

81	82	83	84	85	86	87	88
71	72	73	74	75	76	77	78
61	62	63	64	65	66	67	68
51	52	53	54	55	56	57	58
41	42	43	44	45	46	47	48
31	32	33	34	35	36	37	38
V last stage	22		24	25		27	28

		14			17		
		15			18		
HCCD	23	16	←	26	19	←	29

FIG.39

81	82	83	84	85	86	87	88
71	72	73	74	75	76	77	78
61	62	63	64	65	66	67	68
51	52	53	54	55	56	57	58
41	42	43	44	45	46	47	48
31	32	33	34	35	36	37	38
V last stage	21		24			27	
	↓			↓			↓
		14			17		
	22	15		25	18		28
HCCD	23	16		26	19		29

FIG.40

V last stage

81	82	83	84	85	86	87	88
71	72	73	74	75	76	77	78
61	62	63	64	65	66	67	68
51	52	53	54	55	56	57	58
41	42	43	44	45	46	47	48
31	32	33	34	35	36	37	38
21			24			27	

HCCD

	14			17			
22	15	←	25	18	←	28	
23	16		26	19		29	

FIG.41

V last stage

81	82	83	84	85	86	87	88
71	72	73	74	75	76	77	78
61	62	63	64	65	66	67	68
51	52	53	54	55	56	57	58
41	42	43	44	45	46	47	48
31	32	33	34	35	36	37	38



HCCD

21	14		24	17		27	
22	15		25	18		28	
23	16		26	19		29	

FIG.42

V last stage

81	82	83	84	85	86	87	88
71	72	73	74	75	76	77	78
61	62	63	64	65	66	67	68
51	52	53	54	55	56	57	58
41	42	43	44	45	46	47	48
31	32	33	34	35	36	37	38

HCCD

21	14		24	17		27	110
22	15		25	18		28	111
23	16		26	19		29	112

FIG.43

V last stage

81	82	83	84	85	86	87	88
71	72	73	74	75	76	77	78
61	62	63	64	65	66	67	68
51	52	53	54	55	56	57	58
41	42	43	44	45	46	47	48
31	32		34	35		37	38



HCCD

21	14		24	17		27	110
22	15		25	18		28	111
23	16	33	26	19	36	29	112

FIG.44

V last stage

81	82	83	84	85	86	87	88
71	72	73	74	75	76	77	78
61	62	63	64	65	66	67	68
51	52	53	54	55	56	57	58
41	42	43	44	45	46	47	48
31	32		34	35		37	38

HCCD

14		24	17		27	110	
15	←	25	18	←	28	111	
16	33	26	19	36	29	112	39

FIG.45

V last stage

81	82	83	84	85	86	87	88
71	72	73	74	75	76	77	78
61	62	63	64	65	66	67	68
51	52	53	54	55	56	57	58
41	42	43	44	45	46	47	48
31			34			37	



HCCD

14		24	17		27	110	
15	32	25	18	35	28	111	38
16	33	26	19	36	29	112	39

FIG.46

V last stage

81	82	83	84	85	86	87	88
71	72	73	74	75	76	77	78
61	62	63	64	65	66	67	68
51	52	53	54	55	56	57	58
41	42	43	44	45	46	47	48
31			34			37	

HCCD

	24	17		27	110		210
32	25	18	35	28	111	38	211
33	26	19	36	29	112	39	212

FIG.47

V last stage

81	82	83	84	85	86	87	88
71	72	73	74	75	76	77	78
61	62	63	64	65	66	67	68
51	52	53	54	55	56	57	58
41	42	43	44	45	46	47	48



HCCD

31	24	17	34	27	110	37	210
32	25	18	35	28	111	38	211
33	26	19	36	29	112	39	212

FIG.48

G81	R82	G83	R84	G85	R86	G87	R88
B71	G72	B73	G74	B75	G76	B77	G78
G61	R62	G63	R64	G65	R66	G67	R68
B51	G52	B53	G54	B55	G56	B57	G58
G41	R42	G43	R44	G45	R46	G47	R48
B31	G32	B33	G34	B35	G36	B37	G38
G21	R22	G23	R24	G25	R26	G27	R28
B11	G12	B13	G14	B15	G16	B17	G18

FIG.49

	81	82	83	84	85	86	87	88
	71	72	73	74	75	76	77	78
	61	62	63	64	65	66	67	68
	51	52	53	54	55	56	57	58
	41	42	43	44	45	46	47	48
	31	32	33	34	35	36	37	38
	21	22	23	24	25	26	27	28
V last stage	11	12	13	14	15	16	17	18

HCCD								
------	--	--	--	--	--	--	--	--

FIG.50

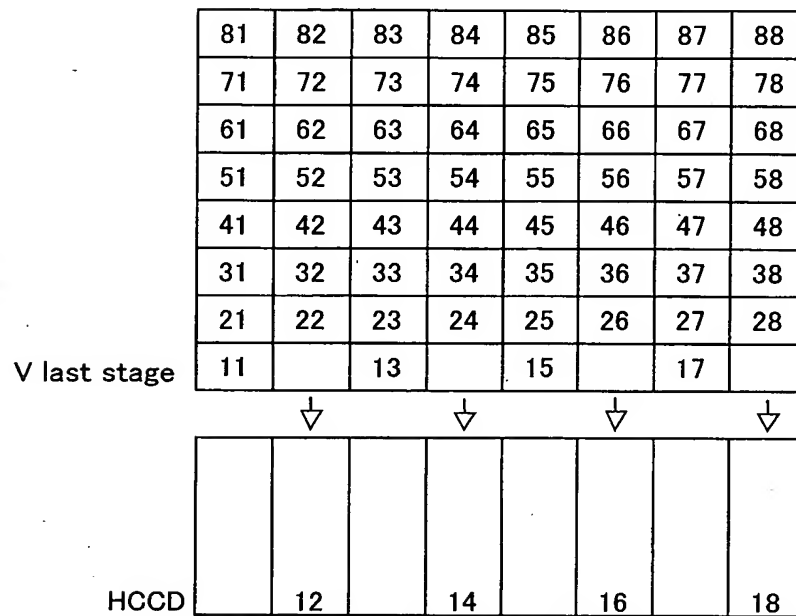


FIG.51

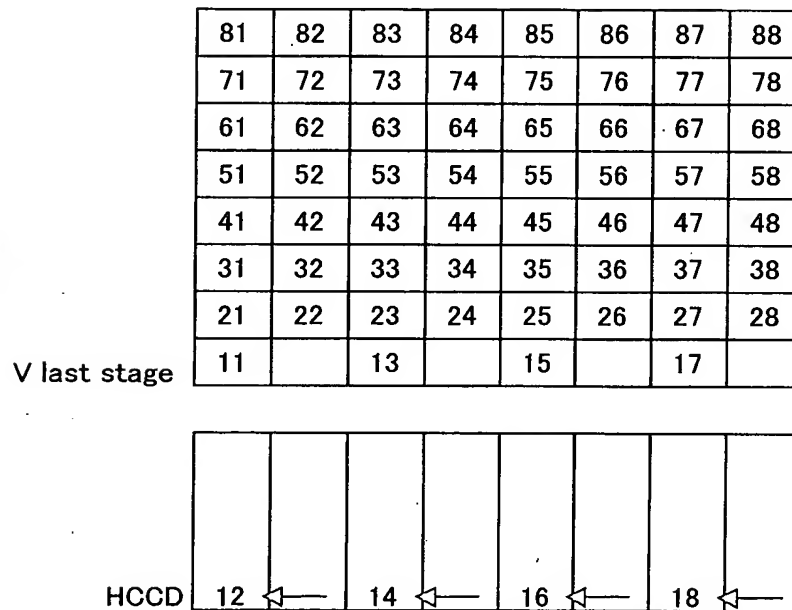


FIG.52

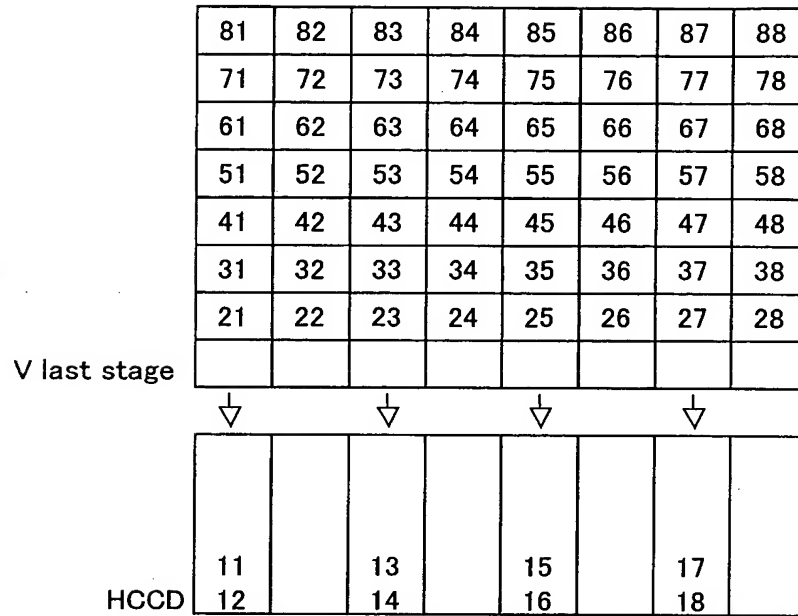


FIG.53

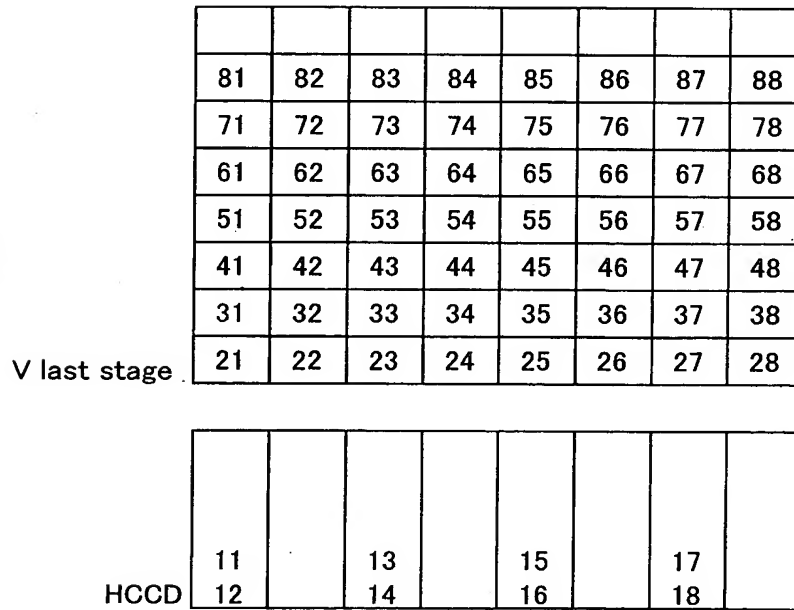




FIG.54

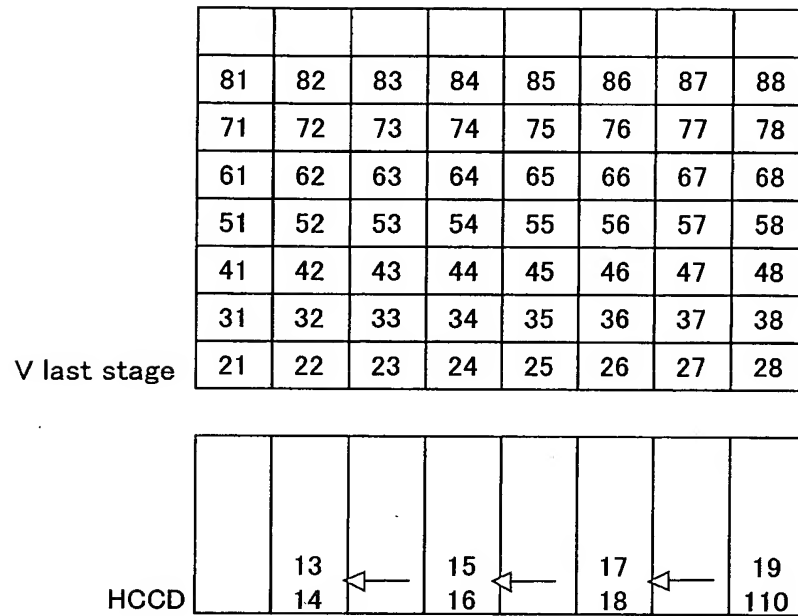


FIG.55

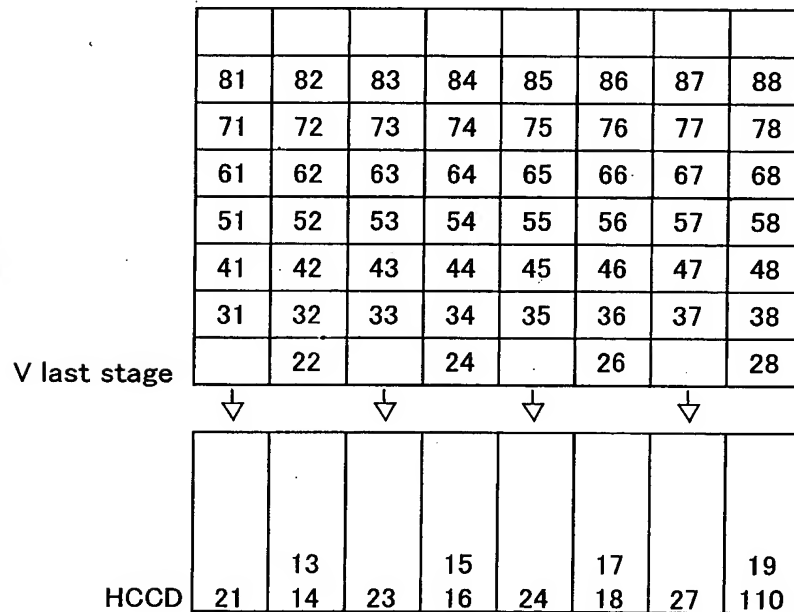


FIG.56

V last stage

81	82	83	84	85	86	87	88
71	72	73	74	75	76	77	78
61	62	63	64	65	66	67	68
51	52	53	54	55	56	57	58
41	42	43	44	45	46	47	48
31	32	33	34	35	36	37	38
	22		24		26		28

HCCD

13	14	23	15	16	24	17	18

FIG.57

V last stage

81	82	83	84	85	86	87	88
71	72	73	74	75	76	77	78
61	62	63	64	65	66	67	68
51	52	53	54	55	56	57	58
41	42	43	44	45	46	47	48
31	32	33	34	35	36	37	38

HCCD

13	22	15	24	17	26	19	28
14	23	16	25	18	27	110	29

FIG.58

81	82	83	84	85	86	87	88
71	72	73	74	75	76	77	78
61	62	63	64	65	66	67	68
51	52	53	54	55	56	57	58
41	42	43	44	45	46	47	48
31	32	33	34	35	36	37	38
21	22	23	24	25	26	27	28
11	12	13	14	15	16	17	18